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THE MARYLAND
AGRICULTURAL EXPERIMENT STATION
STATE HORTICULTURAL DEPARTMENT.

CIRCULAR BULLETIN No. 42. AUGUST, 1902.

INSTRUCTIONS RELATING TO NURSERIES.

By A. L. Quaintance, State Entomologist,
and J. B. S. Norton, State Pathologist.

This bulletin contains information regarding the nursery inspection law of Maryland and the kindred laws of other States, Territories and Countries, and the requirements and recommendations of the State Entomologist and State Pathologist, both to nurserymen and their patrons, regarding the growing and shipping of nursery stock, with special reference to injurious insects and plant diseases. The subject matter is divided into the following parts:

Part I.—Instructions to Maryland Nurserymen.
Part II.—Instructions to Brokers and Dealers.
Part III.—Instructions to Patrons of Maryland Nurserymen.
Part IV.—Instructions to Nurserymen outside of Maryland.

PART I.—INSTRUCTIONS TO MARYLAND NURSERYMEN.

The present year the inspection of nurseries will be made as rigid as possible, and wherever any injurious insects or diseases are detected on the growing stock or on the premises, such must be thoroughly eradicated before a certificate will be given.

Certificates of inspection the present year will cover freedom from the San Jose scale, wooly aphis of the apple, the strawberry root louse, peach yellows, crown gall, fire blight and black knot. In the case of the wooly aphis of the apple, the strawberry root louse and crown gall, which pests are likely to be more or less present in any nursery, a statement will be required from nurserymen where these pests may be found to the effect that stock infested with either of these insects or crown gall will not be sent out to customers, but will be carefully sorted out and destroyed. This is the most feasible method of restricting the distribution of these affections that has occurred to us, as

it is manifestly impossible to destroy every affected tree or plant in the course of nursery inspection, from the fact that to determine whether it is infested or not, it must first be pulled up. It should be stated that most of our nurserymen voluntarily discard all trees showing the presence of the root aphis or crown gall, and this requirement will not come as a hardship to them. Any wilful violation of this agreement will be considered as cause for the withdrawal of our nursery certificate. Under the head of "Instructions to Patrons" on a later page of this bulletin, the attention of the tree-buying public will be called to this restriction in the hope that any cases of violation will be reported to us. It is far from the wish of the officers in charge of this work to make any requirements not entirely warranted by the nature of the case. Several states have already made such restrictions in the case of the wooly aphis of the apple or crown gall, and it is probable that other states will soon follow this example. This requirement, in addition to fumigation, will, it is believed, practically prevent the dissemination of these pests.

The practice of carrying over the odds and ends of last year's stock healed-in in the yards or elsewhere cannot be too strongly condemned. It is possible in this way that serious insects or diseases may become established. This danger is particularly great if stock from other parts of the country are thus held over in the hope of a possible sale. Such trees are not usually in good condition, and will not, as a rule, prove satisfactory to a discriminating purchaser. Each spring, after the season's shipments are over, the yards should be given a thorough cleaning up, and all remnants can be most profitably disposed of by placing them in the fire.

Another point which should receive careful attention is the destruction of all fruit and other trees from the immediate neighborhood of the nursery fields that are at all likely to harbor insects and diseases. When nursery pests become established in such trees, they prove a constant source of infestation to the growing stock, and must occasion serious loss. Nursery fields should be free, as far as possible, from fruit trees, cedars, wild cherry, sumach, hawthorn, walnut and the like.

In another paragraph will be found descriptions of the several pests prescribed as dangerously injurious, and all growers of nursery stock are urged to thoroughly familiarize themselves with the characters and symptoms of these insects and diseases. Under present conditions, where there is so much of buying and exchanging of stock among nurserymen themselves to enable them to fill orders, it will be only by close attention that the exclusion of these pests will be possible.

While the practice of fumigation among nurserymen throughout the country at large is deservedly growing, yet, it has not become universal, and no seedling stock, buds, grafts or cuttings from outside sources should under any circumstances be planted or used until they have been properly subjected to the treatment with hydrocyanic acid

gas. In fact, it is much to be recommended that all buds, grafts or cuttings used for purposes of propagation, even though grown on your premises, be fumigated before being used. This will be an extra safeguard, and no pains should be spared to remove any possibility of the establishment of any of these pests.

It is planned to begin the work of nursery inspection about the middle of August. A certificate issued on an inspection made before this date would manifestly be of little value, since in the case of the San Jose scale for instance, there would yet be time for two or three broods of the insect and consequent dissemination before the cold weather or fall. The inspections to be of the most value should be made as late as possible, but the extent of the nursery industry in Maryland necessitates that work should be begun not later than the date set in order that the inspections may be completed in time for the fall trade.

The officers of the State Horticultural Department desire to most heartily commend the nurserymen of Maryland for the hearty cooperation they have extended in our efforts to fulfill the requirements of the inspection law. There has been a marked improvement in the condition and healthfulness during the past year, and we have no hesitation in saying that in our opinion the conditions of the nurseries of Maryland are in no way inferior to those of any state in the East.

CERTIFICATE.

The following form of certificate is issued to nurserymen, whose premises and stock are free from injurious insects and plant diseases:

CERTIFICATE OF NURSERY INSPECTION.

No.....

TO WHOM IT MAY CONCERN:

THIS IS TO CERTIFY, That on the.....day.....of .....190.....we examined the Nursery Stock of ..... growing in .....nurseries at.....County of.....State of Maryland, in accordance with the laws of Maryland, 1898, Chapter 289, Section 58, and that said nurseries and premises are apparently free, so far as can be determined by inspection, from the San Jose Scale, Peach Yellows, Pear Blight and other dangerously injurious insect pests and plant diseases.

This certificate is invalid after.....190..... and does not include nursery stock not grown within this State, unless such stock is previously covered by certificate and accepted by the State Entomologist and State Pathologist.

.....
State Entomologist.

.....
State Pathologist.

College Park, Md.,.....190....

MARYLAND NURSERY LAW.

The following sections of Laws of Maryland 1898, chapter 289, refer directly to Maryland Nurserymen, and are here inserted for their information and guidance.

"§58. That it is hereby also made the duty of the said board of trustees [Maryland Agricultural College], through the State Entomologist and the State Pathologist, or their duly authorized assistants, to inspect at least once in every six (6) months, all nurseries of trees, vines, shrubs and plants, subject to the aforesaid insects or diseases [San Jose scale, peach yellows, pear blight and other injuriously dangerous insect pests and plant diseases] within the State, and if found free so far as can be determined by inspection, from the aforesaid insects or diseases, to give to the owner or owners or persons in charge of said nurseries a certificate of inspection showing such nurseries or premises to be apparently free from such insects and diseases. If any of the aforesaid insects or diseases should be found in any nursery or orchard, or any premises within the state where nursery stock is grown, the aforesaid officers shall cause to be destroyed or treated such portion of such nursery stock or other trees or plants as in their opinion may be necessary, and shall release all other nursery stock grown upon said premises, and issue a certificate of inspection to the owner or owners as herein provided for; and if such infested or diseased trees, vines, plants or shrubs be destroyed by the aforesaid officers, then the owner shall pay the cost thereof, and if he refuse to pay the same it shall be collected as prescribed in section 56. No nurserymen, broker, agent, dealer or other person shall be permitted to sell, ship, send out, or give away, by mail, express, freight or otherwise, any trees, vines, shrubs, plants, buds or cuttings from any such nurseries or premises, without accompanying the same with a copy of the said certificate printed upon a tag or label not easily destroyed, the same to be firmly attached in some conspicuous position upon each car load, box, bale or package so sent out or delivered.

"§59. That should any nurseryman, agent, broker, dealer or other person send out or deliver within the State, or transport to any other State or Territory or the District of Columbia, trees, vines, shrubs, plants, buds or cuttings, subject to the attacks of insects and diseases above provided for, without attaching a copy of said certificate, deface or destroy said certificate, or wrongfully attach a certificate, he shall be adjudged guilty of a misdemeanor, and shall upon conviction, before any justice of the peace, be fined a sum not less than ten dollars ($10) or more than one hundred dollars ($100) and cost of prosecution for each and every offence, and stand committed until such fine and costs are paid, and the fines so collected shall be paid to the trustees of the said college and be added to the funds herein provided for carrying out the provisions of this Act.

"§59A. That all trees, plants, vines, shrubs, buds or cuttings, commonly known as nursery stock, grown or handled by each and every

nurseryman within this State, and subject to the attacks of the aforesaid insects or diseases shall be fumigated by the nurseryman owning the same with hydrocyanic acid gas in buildings or inclosures inspected and approved by the aforesaid State officers under their discretion."

A BRIEF SYNOPSIS OF LAWS AND REGULATIONS OF OTHER STATES AND TERRITORIES WITH PARTICULAR REFERENCE TO THE REQUIREMENTS FOR THE ADMISSION OF NURSERY STOCK.

ALASKA.—No regulations concerning the transportation and admission of nursery stock seem to be in force. Mr. Fred. E. Rader, Acting Special Agent in charge of Alaska Investigations, Sitka, Alaska, should be addressed if any information is desired.

ALABAMA.—This state has no law in reference to inspection and transportation of nursery stock.

ARIZONA.—There is no nursery inspection law in this territory.

ARKANSAS.—There are no regulations relative to the inspection of nursery stock in this state. Prof. Ernest Walker of the State Agricultural Experiment Station, Fayetteville, has furnished certificates to Arkansas nurserymen when needed by them to secure admission of stock into states where certificates are required.

CALIFORNIA.—Shipments of nursery stock, etc., into this state are inspected upon arrival by the State Quarantine Officer, Mr. Alexander Craw, San Francisco, who must be notified of the receipt of shipments upon its arrival.

COLORADO.—County Inspectors appointed by the State Board of Horticulture must examine all shipments of nursery stock into this state before delivered and disinfect or destroy the same as conditions may require.

CONNECTICUT.—Nursery stock shipped into this state must be accompanied by a certificate of inspection. Prof. W.E. Britton is State Entomologist and should be addressed at New Haven.

DELAWARE.—A certificate of fumigation by the grower or shipper must be attached to each package of nursery stock shipped into this state. Mr. Wesley Webb, Dover, is State Inspector.

FLORIDA.—No certificate of nursery inspection seems to be required for shipments of stock into this state. Certificates have been issued to Florida nurserymen by Prof. H. A. Gossard, Entomologist of the Agricultural Experiment Station, Lake City, upon request.

GEORGIA.—Nurserymen outside of Georgia, who desire to do a business in the state, must file a copy of an accredited certificate of inspection with the State Entomologist, W. M. Scott, Atlanta, Ga. Upon receipt of this certificate, official tags will be issued by the State Entomologist of Georgia, which should be attached to every package shipped into the state. These tags will be furnished at a cost of sixty cents for the first hundred and twenty-five cents for each additional hundred.

IDAHO.—Nursery stock not grown in this state is prohibited from sale or distribution until examined by the Inspector. If found diseased, the same shall be disinfected. All packages shipped into the state should bear a label indicating the character of the shipment, name of shipper and locality where grown. Trees subject to yellows are not admitted to the state from districts where yellows exists.

ILLINOIS.—All shipments of nursery stock into this state must bear name of consignor and certificate of inspection of current year's date. Prof S. A. Forbes, Urbana, is State Entomologist.

INDIANA.—Packages of nursery stock shipped into this state must bear a certificate of inspection signed by a state or government inspector. Prof. James Troop, Lafayette, is State Entomologist.

IOWA.—When nursery stock is shipped into this state accompanied by a certificate of nursery inspection, this shall be held as *prima facie* evidence of the facts therein stated. It is unlawful to make shipments of stock into the state unless accompanied by proper certificate. Prof. H. E. Summers, Ames, is State Entomologist.

KANSAS.—There seems to be no law governing the inspection or transportation of nursery stock. Prof. E. A. Popenoe, Manhattan, has issued certificates of inspection to Kansas nurserymen as desired.

KENTUCKY.—Shipments of stock into this state must be plainly labelled, showing the name of the consignor, the consignee and contents, and must bear certificate, showing that stock has been inspected, and has been found free from insect pests and fungus diseases. Prof. H. Garman, Lexington, is State Entomologist.

LOUISIANA.—All fruit trees, etc., brought into the state must be labelled with name of owner or grower and locality where grown and shall be subject to inspection by the Entomologist of the State Experiment Station.

MAINE.—There seems to be no law in reference to the certification and transportation of nursery stock.

MARYLAND.—All nursery stock shipped into this state must bear a copy of an accredited certificate of nursery inspection. All nurseries in the state must be inspected and a certificate issued when found free from injurious insects and diseases. Nurserymen in the state are required to fumigate all stock before shipping. A. L. Quaintance, State Entomologist and J. B. S. Norton, State Pathologist, College Park.

MASSACHUSETTS.—A certificate of nursery inspection must accompany each shipment into this state. H. T. Fernald, Amherst, is the State Inspector.

MICHIGAN.—Nursery stock shipped into this state must be plainly labelled with the names of the consignor, the consignee and contents and must bear a certificate of nursery inspection. D. W. Trine of Lansing, is State Inspector.

MINNESOTA.—This state has no law governing the inspection and transportation of nursery stock. Certificates of inspection are is-

sued to nurserymen in the state by the State Entomologist, F. L. Washburn, St. Anthony Park, St. Paul.

MISSISSIPPI.—There seems to be no regulations in this state concerning the inspection and transportation of nursery stock.

MISSOURI.—Shipments from outside of the state must be labeled with the name of the consignor, consignee and contents, and bear a certificate showing inspection by a State or Experiment Station Entomologist. For further information address George B. Ellis, Secretary State Board of Agriculture.

MONTANA.—In this state, it is required that all nursery stock before delivered to the purchaser, shall be unpacked and fumigated at certain points along the various railways. For particulars address, C. H. Edwards, Secretary of State Board of Horticulture, Missoula.

NEBRASKA.—This state has no law governing the inspection and transportation of nursery stock.

NEVADA.—There is no law governing the inspection and transportation of nursery stock.

NEW HAMPSHIRE.—No law in reference to the certification and transportation of nursery stock.

NEW JERSEY.—In order to ship nursery stock into this state, each package must bear a copy of a certificate obtained from the proper state or government authorities where stock was grown, stating that stock has been properly inspected not more than six months before shipment and found free from San Jose scale or other dangerous insects. Dr. J. B. Smith is State Entomologist at New Brunswick.

NEW MEXICO.—There seems to be no law governing the transportation of nursery stock in this state.

NEW YORK.—Certificates of nursery inspection are issued to nurserymen by C. A. Wieting Commissioner of Agriculture, Albany. Transportation companies within the state are required to notify the Commissioner of Agriculture, Albany, N. Y., when shipments of nursery stock are received from points without the state, giving name of consignor, consignee and destination. All nursery stock shipped into the state must be subjected to fumigation. When done by the consignor, a certificate should be attached, indicating this fact.

NORTH CAROLINA.—No transportation company shall deliver nursery stock from within or without the state unless each package bears a label stating the name and address of grower together with an official certificate of nursery inspection. Nurserymen outside of the state must send copy of their certificates to the North Carolina Department of Agriculture, Raleigh, and one hundred tags will be sent them to tag the stock. One of these tags must be attached to each shipment. The first one hundred tags are furnished free, but all over this at forty cents per one hundred. Franklin Sherman, jr., Raleigh, is State Entomologist. Nursery stock subject to yellows is not admitted from any region known to be infested with the yellows.

OHIO.—Every package of nursery stock shipped into this state must be plainly labeled with the name of the consignor and consignee

and bear a copy of an official certificate of nursery inspection. A. F. Burgess, Columbus, is General Inspector.

OKLAHOMA.—This territory has no law in reference to the inspection and transportation of nursery stock.

OREGON.—All consignees or other persons receiving shipments of nursery stock from without the state must within twenty-four hours notify the Quarantine Officer of the State Board of the arrival of same. Such nursery stock on arrival at the Quarantine Station must be inspected by State officers, who shall issue a certificate if stock is found free from insect pests or fungus diseases. Nursery stock subject to yellows is not admissable from regions where yellows exists. Further information may be had by addressing the State Board of Horticulture, Salem

PENNSYLVANIA.—Nursery stock shipped into this state must bear on each package the name of the consignor, the name of the consignee and a certificate of nursery inspection which shall be held as *prima facie* evidence of the facts therein stated. Certificates are issued by Mr. John Hamilton, Secretary of Agriculture, Harrisburg.

RHODE ISLAND.—This state has no law relating to the inspection and transportation of nursery stock. Certificates of inspection have been issued to Rhode Island nurserymen by Prof F. W. Card, Kingston.

SOUTH CAROLINA.—Persons without the state desiring to do business in South Carolina, must register their names and file a copy of their certificate of inspection with the Chairman of the Board of Entomology at Clemson College. Otherwise, shipments may be destroyed.

SOUTH DAKOTA.—There is no law in this state governing the transportation of nursery stock. Certificates have been issued to nurserymen by Prof. D. A. Saunders of the State Agricultural College, at Brookings.

TENNESSEE.—Shipments of nursery stock from other states must bear a copy of certificate of nursery inspection. The State Entomologist should be addressed at Nashville.

TEXAS.—There seems to be no law in this state pertaining to the certification or transportation of nursery stock.

UTAH.—All persons receiving shipments of nursery stock from points outside of the state shall notify the County Inspectors, who shall examine the same. J. A. Wright, Logan, is Secretary of the State Board of Horticulture.

VERMONT.—This state has no inspection law. Certificates have been issued to Vermont nurserymen by the Entomologist of the Agricultural Experiment Station, Burlington.

VIRGINIA.—All shipments of nursery stock from without the state must bear a certificate of inspection. In addition an official tag furnished by the Virginia State Entomologist is required. This tag is furnished on certificates of inspection to be filed with the State Entomologist of Virginia and the tags are issued if this certificate is found

satisfactory. These official tags will be furnished on application at the following prices: twenty-five tags twenty cents, fifty tags twenty-five cents, one hundred tags thirty cents, two hundred and fifty tags sixty-five cents, five hundred tags ninety-five cents, one thousand tags one dollar and fifty cents, postpaid. Payment should be made by postal order in advance to W. B. Alwood, State Entomologist and Pathologist, Blacksburg.

WEST VIRGINIA.—A certificate of nursery inspection is required on each shipment of nursery stock into this state. The inspection work is in charge of the Director of the Experiment Station at Morgantown.

WISCONSIN.—Nursery stock shipped into this state must bear a certificate, stating that it has been properly inspected and found free from San Jose scale, etc. The inspection work of the state is in charge of W. A. Henry, Director of the Agricultural Experiment Station at Madison.

WYOMING.—There seems to be no legislation relating to nursery stock in this state.

CANADA.—Importations of nursery stock are permitted to enter at the custom ports only of St. John, N. B., St. Johns, Quebec, Niagara Falls and Windsor, Ontario and Winnepeg, Manitoba, between the 7th of October and the 7th of December in the fall, and between the 15th of March and the 15th of May in the spring. Stock will be admitted at Vancouver, B. C., only from the 15th of October to the 15th of March each year. At these ports, stock must be thoroughly fumigated by a government official with hydrocyanic acid gas. Packages to enter Canada must be addressed to one of the ports named. Immature stock or stock too far advanced for treatment will be refused entry. If further particulars are desired, address Mr. John J. McGee, Clerk of Privy Council, Ottawa, Ontario.

FOREIGN COUNTRIES.—When it is desired to ship nursery stock to foreign countries, you are requested to correspond with this department in reference to the requirements of any particular country.

INSECTS PRESCRIBED AS DANGEROUSLY INJURIOUS.

(I). San Jose Scale.—This insect is very small, and may be readily overlooked, except by an experienced person. The mature female scale is approximately the size of a pin head, or may be somewhat larger, particularly where the individuals are more or less isolated, and thus have a better chance to develop. By the use of a hand lens, which every nurseryman should have, the female scale is seen to be of an ash grey color, circular in outline, somewhat conical and terminating at the top in a nipple-like prominence which is surrounded by a distinct line. By referring to Figure 1, a better idea of the insect may be obtained. The San Jose scale may occur on the following plants: peach, plum, apple, pear, apricot, cherry, quince, almond, rose, hawthorn, raspberry, spiraea, cotoneaster, prunus pissardii, strawberry, flowering quince, mountain ash, gooseberry, currant, flowering currant, grape,

English walnut, pecan, black walnut, persimmon, elm, osage orange, linden, euonymus, weeping willow, Kilmornock willow, English willow, golden willow, cottonwood, Lombardy poplar, Carolina poplar, catalpa, sumach, silver maple and, perhaps, some others. In fact, it may be said that this species is practically omniverous, so far as deciduous plants are concerned, and the difficulty of its eradication after it has once become established is at once apparent.

In our inspection of nurseries last year, out of the forty-seven nurserymen in the State, forty-two were given certificates. The inspection

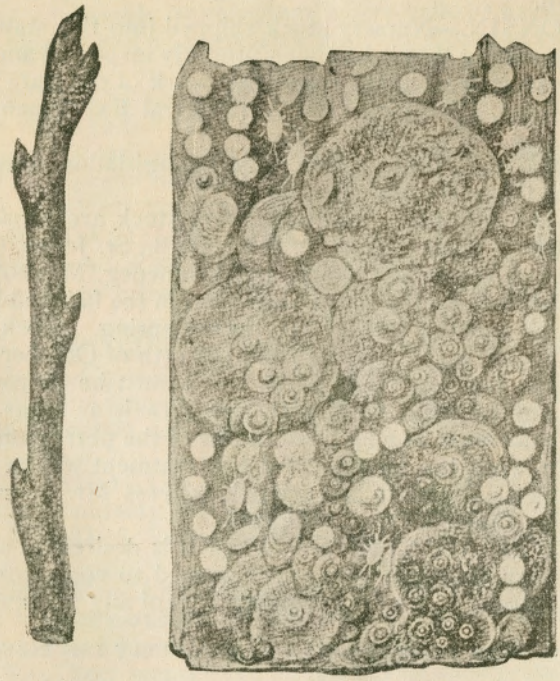

Figure 1.—San Jose Scale: a, infested twig; b, a view of infested bark magnified. (After Howard and Marlatt.)

revealed that in several cases, there was need of immediate work on the parts of the owners before certificates could be granted. In all, it was necessary to destroy stock probably to the valuation of $25,000.00. Despite this hardship to nurserymen, they have willingly followed our recommendations in the work of extermination, and at the present time there is every reason to believe that these nurseries are in a most excellent condition.

Whenever it is noticed or suspicioned that this pest has appeared in any nursery, you should acquaint the department with this fact at

once. Steps may then be taken to effect its eradication before it has spread to any extent. Prospective nurserymen should by all means consult with the department before selecting a location. In some sections of the State it would be decidedly unwise to embark in the nursery business, owing to the prevalence of the San Jose scale.

(II). The Wooly Apple Aphis.—This insect is illustrated in Figure 2, and the character of its injury to the apple roots is shown in

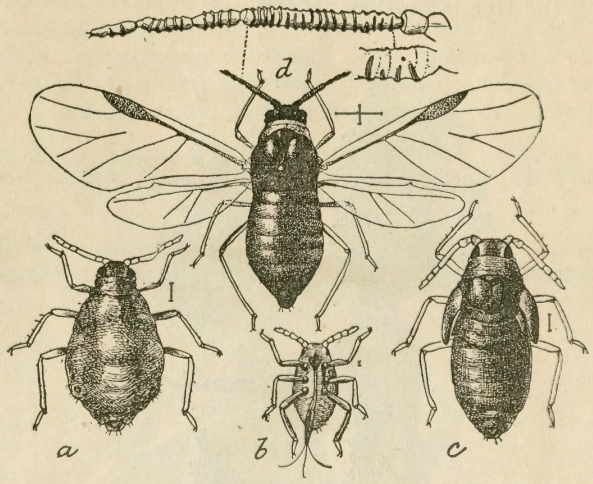

Figure 2.—The Wooly Apple Aphis: a, agamic female; b, larva; c, pupa; d, winged female. (After Marlatt).

Figure 3. The insects occur on the stem and twigs as well as on the roots of the apple, but it is particularly the root form to which attention of nurserymen should be called. Our observations concerning this pest warrants the statement that trees infested from a nursery when set out in the orchard will rarely grow in a satisfactory manner, and are likely to become permanently stunted, or may finally die outright. In the future, therefore, nurserymen will be required to discard all nursery stock sufficiently infested with the wooly aphis as to show knots or warts on the roots. In cases of slight infestation, where the insects have not caused the knotty condition of the roots, such stock may be sold from the fact that the pest will be exterminated by the process of fumigation.

Much may be done in the way of nursery management to secure comparative freedom from the wooly aphis. In the first place no seedling stock, whole, or piece-root grafts, should be planted from whatever source until they have been properly fumigated, not only on account of this insect, but other species as well. After the aphis becomes established in a soil, it is difficult to effect its eradication, hence the necessity of a system of rotation, such that the same land will not be replanted in apples without alternation with other classes of

stock. Old apple trees in the neighborhood may serve as sources of infestation, and should be disposed with wherever possible.

The practice of spraying apple nursery stock occasionally during the growing season with whale oil soap solution, at the rate of one pound of soap to four or five gallons of water, as now done by some of our leading nurserymen, cannot be too strongly commended. Not only will the aerial form of the wooly aphis be destroyed as well as the aphis causing the curled and misshapened condition of the leaves, but the effect on the tree is most beneficial.

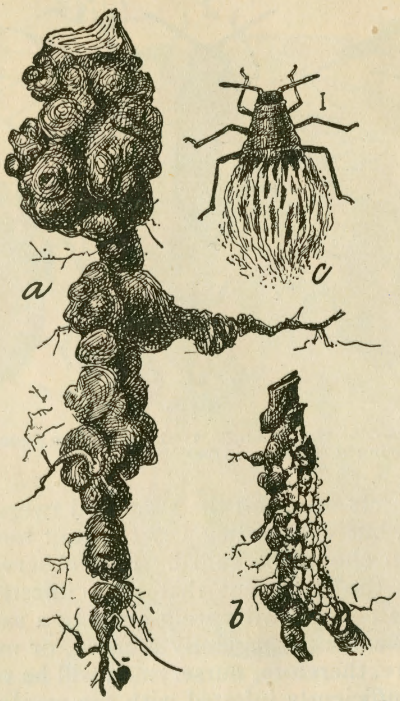

Figure 3.—Illustrating the work of the Wooly Apple Aphis on the roots: a, an apple root showing knots caused by the work of the insect: b, a colony of aphids on root; c; a louse. (After Marlatt).

(III). Strawberry Root Louse.—These insects are very small, being but about one-twentieth of an inch in length. The body is somewhat pear-shaped, tapering towards the head, and of a dark-bluish black color. The lice occur on both the roots and foliage, but injury is done particularly by the lice on the roots. Where numerous spots occur in the strawberry fields from which the plants have died, the presence of this aphid should be suspected. By pulling several plants and examining the roots, this can be readily determined. The lice occur in

clusters along the roots. Ants are usually associated with the aphid, and construct numerous nests around the plant and among the plants infested.

So far as known, the strawberry root louse occurs only on the cultivated strawberry plant, and the work of controlling it thus becomes much easier than if it had a considerable number of food plants. To keep this pest from the nursery, clean plants must be planted on clean land. A system of frequent rotation should be followed, not planting the same land to strawberries, except after intervals of two or three years. All plants before being planted out should be subjected to the gas treatment. According to recent experiments in Delaware, but little, if any injury to plants will result by the use of two-tenths gram potassium cyanide per cubic foot for a period of forty-five minutes.

SOME OTHER SCALE INSECTS, WHICH, WHILE NOT DANGEROUSLY INJURIOUS, SHOULD NOT BE PERMITTED ON THE STOCK OR PREMISES OF NURSERYMEN.

(I). The Scurfy Bark Louse.—This scale insect is likely to be present in any apple orchard in the country. We have frequently found

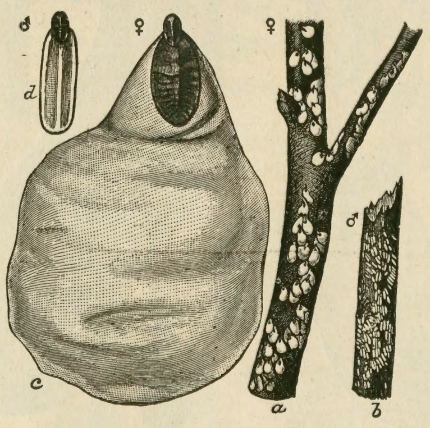

Figure 4.—The Scurfy Bark-Louse: a, b, infested twigs; c, female; d, male scale. (After Howard.)

it on nursery stock where it had doubtless spread from such places. Many purchasers of trees not acquainted with the different species of scale insects may become alarmed at the presence of this or other scale, and a serious injury might thus result to your trade. The accompanying figure, Figure 4, illustrates this pest. The eggs are laid in the early fall, and occupy the greater part of the scale. The winter is passed in the egg condition, and the young hatch during the latter part of May or early June. To eradicate this and the other species of insects to be considered under this head, infested trees should be thoroughly sprayed with any of the ordinary insecticides recommended

against scale insects, such as whale oil soap, kerosene or crude petroleum emulsions.

(II). The Oyster Shell Bark Louse.—This is a common and widely- distributed species of scale, which at times becomes so abundant as to seriously injure infested trees. It occurs on the apple, peach, plum, pear, lilac and many other plants. It should have no place on the premises or stock of the wide-awake nurseryman. The insect is illustrated in Figure 5, from which it may be readily recognized. The insect passes the winter in the egg state, and the young hatch in May or early June, and crawl out on the twigs and small branches and there locate permanently. The insect may be most readily killed at this

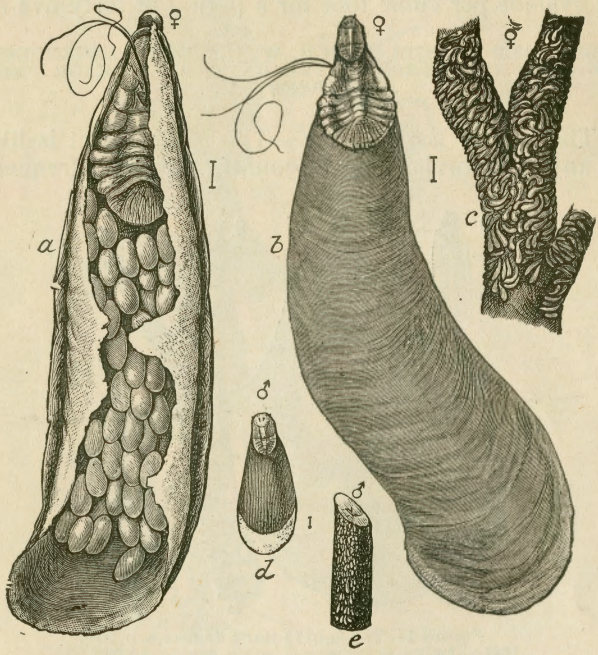

Figure 5.—The Oyster-Shell Bark Louse: a, b, females; c, scales on twigs; d, male scale. (After Howard).

season of the year, and spraying infested plants as directed for the scurfy bark louse will enable anyone to keep this pest under complete subjection.

(III). The Peach Scale.—This insect is illustrated in Figure 6. Owing to its white color it is sometimes known as the whitewash scale. This is a most serious pest of the peach in certain sections of the Southeastern United States, large orchards having been killed by it. So far as we are aware, the insect does not as yet occur in Maryland, but from the fact that it is very common on various shrubs and trees in the District of Columbia, and has already established itself in certain

parts of Massachusetts, it is deemed desirable to call the attention of nurserymen to it. Should it ever be found or introduced in any nursery, energetic steps should be at once taken to effect its complete eradication, if possible. While it is not as injurious as the San Jose

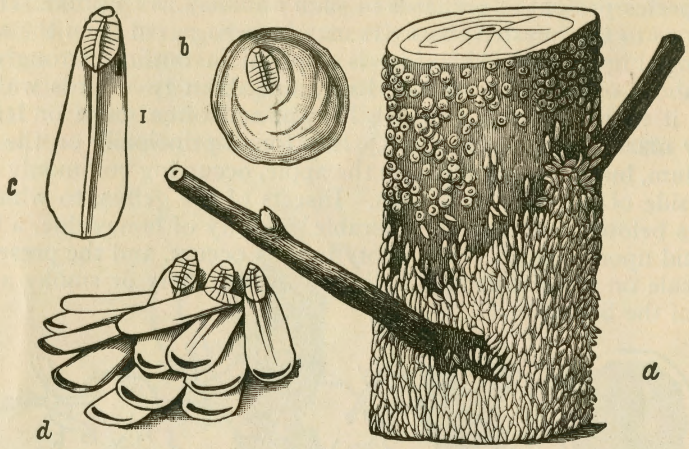

Figure 6.—The Peach Scale: a, infested branch; b, female; c, male; d, group of male scales. (After Howard)

scale, yet it must be ranked as one of the most serious pests that has become established in this country.

(IV). The European Fruit Scale.—At the present time this insect, so far as known, is as yet established only in certain Northern

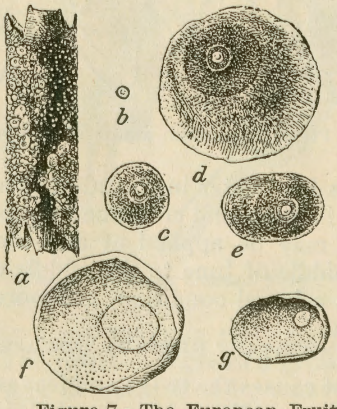

Figure 7.—The European Fruit Scale: a, scales on twig; b, natural size; c, immature stage; d, female; e, male; f, g, inside of scales. (After Marlatt.)

States. It is a very serious scale insect of the orchard, and nurserymen should be on the lookout for it at all times. Its introduction in a nursery should be immediately followed by every effort to effect its extermination. The scale is shown in Figure 7. This species can be

distinguished from the San Jose scale from the fact that the exuvium is orange or reddish colored, whereas in the case of the San Jose scale this is pale bluish or bark colored.

(V). The Peach Lecanium.—Not infrequently we have found this species present in orchards in such numbers as to prove seriously injurious to the infested trees. It may be recognized from the accompanying Figure 8. The insect is eliptical in outline, strongly convex, about one-fifth of an inch long, and about two-thirds wide. In color, it is usually dull greenish brown, and often more or less distinctly marked with dark bands. It is found principally on the peach and plum, but may also occur on the apple, occurring commonly on the underside of the twig or branch. Insects of the genus, to which this species belongs, exude a considerable quantity of honey due, a sweetish fluid upon which a black, sooty fungus occurs, and the presence of this scale on trees is usually indicated by the sooty or smoky appearance of the branches.

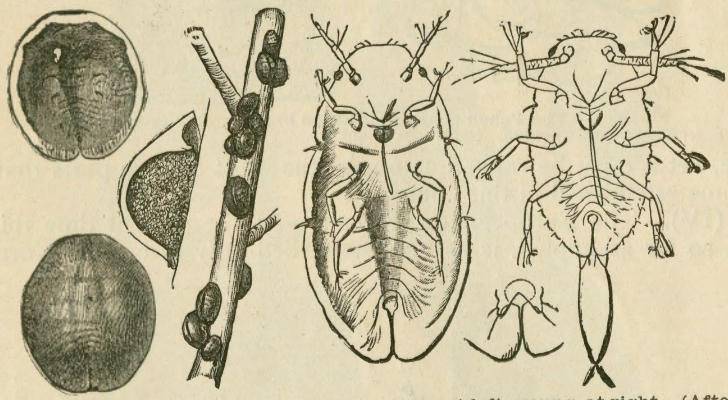

Figure 8.—The Peach Lecanium: adults at left, young at right. (After Howard).

The insects pass the winter in the adult condition and the young begin to hatch early in June, and continue to appear for quite a month. Remedial measures may be applied at any time during the winter, and also from the middle of June to the middle of July, at which time the insects, being in a larval condition, are more readily killed.

IMPORTANT NURSERY DISEASES.

(I). Fire Blight causes the twigs and leaves of peach, pear, apple, quince and related trees to die and blacken. Blighted twigs should be cut off several inches below the diseased portions and burned. The pruning knife used should frequently be disinfected in a strong solution of formalin or carbolic acid to prevent the germs of the disease being carried by it.

(II). Peach Yellows is undoubtedly disseminated from the nursery, and although the disease is present, it is rarely well developed

enough to be distinguished in the nursery. The means of control lie in using pits from regions not infested with yellows, in the judgment of many best from seedling trees, and in using buds from orchards perfectly free from yellows. It is of the utmost importance to examine trees carefully before buds are taken to insure their perfect healthfulness and vigor. Even when apparently sound, they may convey yellows, then in an incipient stage, to trees budded from them. Yellows also attacks Japan plums, apricots, nectarines and almonds.

(III). Leaf Diseases, such as apple scab, apple leaf rust, peach leaf curl, and the various leaf spots of apple, cherry, pear, etc., can be

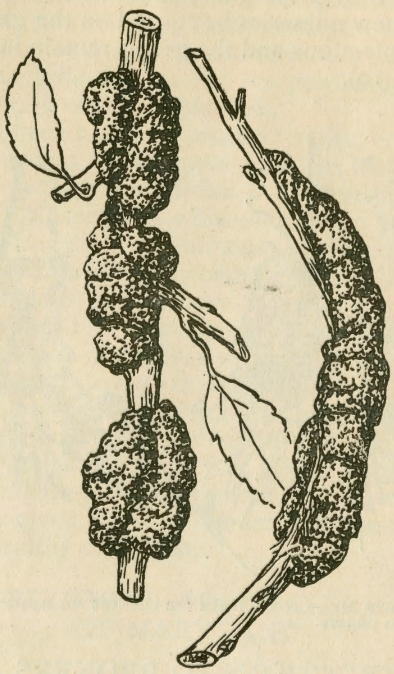

Figure 9.—Black Knot on Plum.

controlled by spraying a few times in early spring and summer with Bordeaux mixture. The profit in increased growth and vigor of trees so sprayed was long ago demonstrated by many experiments.

(IV). Grape Mildew, which often seriously retards the growth of cuttings in the nursery, can be prevented by spraying with Bordeaux mixture.

(V). Black Knot is a serious disease of cherries and plums, (Damson in particular). The large, rough, black excrescences on trees and branches are a good and easily recognized symptom. (See Figure 9). Knotted trees should be destroyed from the nursery. Fire is the best

disinfectant for this and most other diseases. It should be used freely around the nursery. It is cheap and effective.

(VI). Anthracnose of blackberry and raspberry should be guarded against with great care in the nursery since the disease is difficult to eradicate. To those unfamiliar with it, it may be indicated by the scabby cracked spots on the canes.

(VII). Crown Gall is one of the worst diseases found in the nursery, and is easily recognized by the rough irregular, somewhat spherical outgrowths averaging an inch or less in diameter on the roots of young peach, pear, apple, plum, raspberry and other related plants. It usually occurs near the surface of the ground. In digging, trees infested in the least with these galls, should be discarded and burned. In no case should new nurseries be started on the ground infested with the gall since it is infectious and the germs remain in the ground sometime. (See Figure 10).

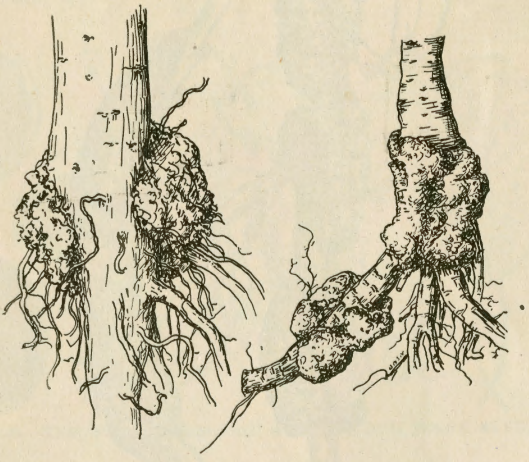

Figure 10.—Crown Gall: On the left on apple, on the right on peach

PART II.— INSTRUCTIONS TO BROKERS AND DEALERS.

Brokers or dealers in nursery stock in the state will be required to file with the State Horticultural Department a statement showing from what nurserymen they are obtaining or propose to obtain their stock. This is considered necessary to meet the requirements of the following clause in our certificate of nursery inspection: "This certificate is invalid after ————————, and does not include nursery stock not grown within this state, unless such stock is previously covered by certificate, and accepted by the State Entomologist and State Pathologist."

PART III.—INSTRUCTIONS TO THE PATRONS OF MARYLAND NURSERYMEN.

The purpose of the nursery inspection law is primarily to protect the interests of purchasers of nursery stock. To secure the best results in our efforts to guard your interests, we must have your cooperation, to the extent at least that you notify us when the sections of the law, relating to the certification and transportation of nursery stock, have been violated either by nurserymen within or without the state.

By reference to these sections as printed in this bulletin, the requirements may be readily determined. As has been stated, however, with but very few exceptions we have had no cause to complain of lack of cooperation on the part of Maryland nurserymen. As a whole, the gentlemen engaged in the nursery business in this state have evidenced the fact that they have the interests of the purchaser at heart and will spare no means to give entire satisfaction.

We have often been asked of prospective buyers of nursery stock whether such and such a nurseryman was free from insects and diseases. We have invariably stated that if the nurseryman in question had our certificate of inspection, without which it is unlawful for him to do business, this was the best guarantee we could give and that the possession of this certificate was to be accepted at its face value. It is our business to make a certificate stand for everything that is stated on it and none are issued until a strict compliance with its conditions have been met. The possession of a valid certificate of nursery inspection by any nurseryman in the state may therefore be held as evidence that his stock and premises, so far as we have been able to determine by a careful inspection, are entirely free from dangerously injurious insects and plant diseases. As an extra precaution, all nurserymen in Maryland are required to fumigate before shipment and where both inspection and fumigation are given, there is almost absolute assurance that the stock will be in a healthy condition.

PART IV.—INSTRUCTIONS TO NURSERYMEN OUTSIDE OF MARYLAND.

Section 60 of the State Law plainly defines the requirements of nurserymen or dealers outside of the state and is here inserted for their information.

"Section 60. That when any trees, plants, shrubs, vines, buds or cuttings commonly known as nursery stock are shipped into this State from any other State or Territory, or the District of Columbia, to any nurseryman, broker, dealer, agent or other person in this State, every carload, bale, box or package thereof shall be plainly labelled on the outside with the name of the consignor, the name of the consignee, and a certificate showing that the contents have been inspected by a qualified State or government officer, and that the trees, plants, vines, shrubs or cuttings therein contained are apparently free from the in-

sects and diseases herein provided for. Whenever any trees, plants, vines, shrubs, buds or cuttings are shipped into this State from any other State or Territory, or the District of Columbia, without such certificate plainly fixed on the outside of each carload, box, bale or package, the agent of the transportation company, firm or person receiving same shall not deliver said nursery stock to the consignee or agent representing the consignor, and said agent of the transportation company, firm or person, shall notify the State Entomologist or State Pathologist at the Maryland Agricultural College, and said State officer receiving such notification shall immediately notify any justice of the peace of this State to issue a summons for the consignee, and the agent or consignor, if he be known, of such carload, bale, box or package of nursery stock, to appear before him on a certain day to be named therein, to show why such trees, plants, vines, shrubs, buds or cuttings should not be seized as being in violation of the provisions of this Act, and on trial thereof, if said justice be satisfied that the provisions of this Act have been violated, said justice shall order said agent or consignee to return such carload, box, bale or package of trees, plants, shrubs, vines, buds or cuttings immediately to the shipper or consignor, unless said consignee or agent of the consignor at his expense, shall forthwith have said nursery stock examined by the State Entomologist and the State Pathologist of this State, and said officers certify to such justice of the peace that said nursery stock is apparently free from the insects and diseases mentioned herein, and tag every such carload, box, bale and package inspected by said officers, with their certificate of inspection, and if said agent or consignee shall fail to have said nursery stock examined by said State officials, or fail to return such carload, box, bale or package thereof, then said justice of the peace shall order and direct the constable or sheriff to burn and destroy all such trees, plants, shrubs, vines, buds or cuttings that have been shipped into this State in violation of this Act."

All nurserymen who desire to do a business in this state should file with the State Entomologist, before November 1, a copy of their nursery inspection certificate. While this is not required by law, we desire these certificates to determine, as far possible, by whom the inspections were made. No tags from this department are necessary on shipments into the state. Simply attach copy of your certificate of nursery inspection, and shipments will be delivered by our transportation agents. It is not desired to in any way restrict the commerce of outside nurserymen in this state, but any violation of the above section will be immediately dealt with.